High Frequency Communication Systems

Homework 7 - Antenna Arrays - Analysis and Design

Semester 2, 2020/21

1. Plot the array factor for an *ordinary* endfire array which is uniformly excited, and contains five elements with spacings $d = 0.35\lambda$. Consider the main direction of radiation, $\theta_0 = 180°$. Sketch as well as plot using a computer program the radiation pattern of the array. [5]

2. Design a six element antenna array with a design requirement of SLL = 0 and the main beam in the endfire direction $\theta_0 = 0°$.
   (a) For the element spacing of $d = 0.25\lambda$, find and plot the radiation pattern, and calculate the first null beamwidth (BWFN). [5]
   (b) Repeat for $d = 0.40\lambda$ [3]
   (c) For an application requiring higher directivity, which array configuration is better? [2]

3. For the array configuration as shown in Fig. 1, find and plot the radiation pattern. [5]

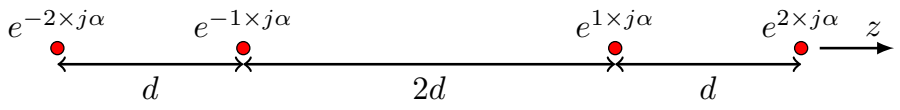

Figure 1: Antenna Array Configuration.